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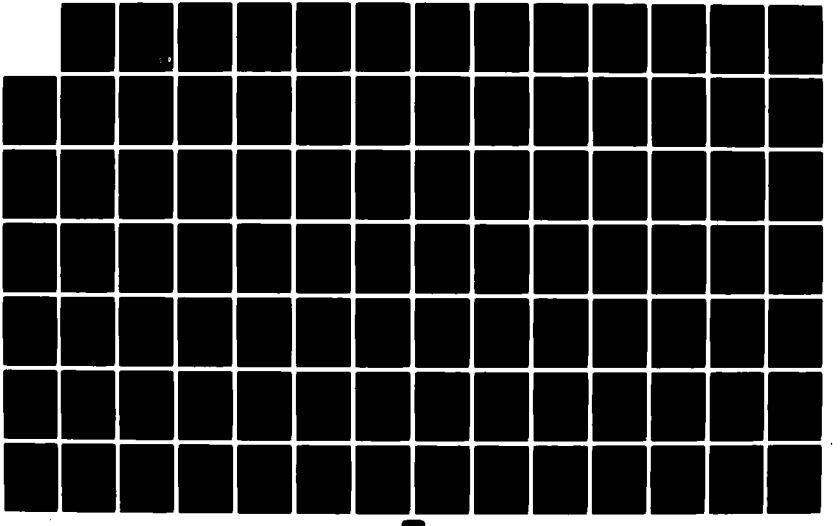

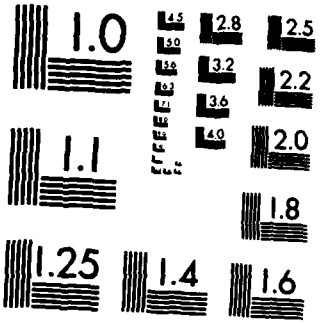

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THE ASSESSMENT OF HABIT DISORDERS: A TRIPARTITE PERSPECTIVE IN MEASURING CHANGE

Michael Graham Eppinger

1981

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Doctor of Philosophy

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ABSTRACT

With the recent trend in developing multicomponent treatment strategies, outcome research has largely failed to embrace or formulate multidimensional measures of change. Nowhere is this trend more evident than in habit disorder research.

To establish a philosophic foundation, Plato's tripartite view of the soul was proposed and expanded as an orientation to describe three basic realms of human functioning: conation, cognition, and affection. This orientation was then applied to the development of a comprehensive assessment approach for measuring outcome in obesity and tobacco smoking research. A review of the present literature on dependent measures in these areas indicate an overwhelming abundance of measurement devices in the conation dimension. In response to these deficits, proposals and recommendations are proferred to expand the measurement focus within obesity and tobacco smoking research.

82-820

THE ASSESSMENT OF HABIT DISORDERS: A TRIPARTITE PERSPECTIVE IN MEASURING CHANGE

A Dissertation

Presented to the

Department of Psychology

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In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Michael Graham Eppinger

August 1982

This dissertation by Michael Graham Eppinger is accepted in its present form by the Department of Psychology of Brigham Young University as satisfying the dissertation requirement for the degree of Doctor of Philosophy.

Michael J. Lambert, Committee Chairman

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Robert C. Bennion, Committee Member

July 1, 1981
Date

David V. Stimpson, Graduate Coordinator

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CHAPTER 1

INTRODUCTION AND STATEMENT OF THE PROBLEM

Within the last 15 years, there has been a virtual explosion of treatment outcome studies for problems which have been loosely classified under a habit disorder rubric. These studies demonstrate a typical pattern in the assessment of change: post-treatment measures show impressive support for a particular treatment procedure, but then lose significance on long-term follow-up or replication. While this trend is most characteristic of habit disorders, it occurs with many other disorders as well (Bergin & Lambert, 1978; Garfield, Prager, & Bergin, 1971; Strupp, 1978). From this writer's perspective, psychotherapy outcome patterns of this type, when they are not the result of weak treatment methods, can be traced directly to a lack of philosophical direction, an unclear conception of the disorder, and an unyielding reliance on traditional measures.

In a trial and error fashion, subtle, but important changes have evolved in strategies of habit disorder treatment. Researchers are beginning to recognize the inadequate procedure of treating habit disorders from a single dimension; most often, a dimension of behavioral/external focus. For example, Lazarus (1973; 1976) has parted from traditional behavior therapy by rejecting the notion that complex disorders can be treated from a unidimensional strategy of intervention. As an alternative, he proposed that greater endurance

of change can be achieved through the pragmatic application of techniques from behavioral, cognitional, emotional, and social realities. In a similar thrust, Mahoney (1974a) has championed the idea that "private events" (thoughts, feelings, and memories) are a viable and necessary dimension of treatment. The denial or exclusion of such phenomenon is a serious drawback to treatment success. From a more general perspective, Walter Mischel has long since recognized the inadequacies of a unidimensional assumption to reality. He has repeatedly emphasized the need for a broadening of philosophical and professional outlook:

> For me, one of the most impressive--and obvious--lessons from the history of personality measurement is the recognition that complex human behavior tends to be influenced by many determinants and reflects the almost inseparable and continuous interaction of a host of variables both in the person and in the situation [Mischel, 1977, p. 246].

Although treatment planners are now employing multidimensional treatment procedures, outcome research has failed to keep pace in providing valid, multidimensional measures of change (Garfield, 1978; Goldstein, Heller, & Sechrest, 1966; Kiesler, 1966; 1971; Strupp, 1964; Urban & Ford, 1971). Nowhere is this trend more evident than in habit disorder research. To illustrate, Wilson (1978) points out that a large number of outcome studies and dissertations on obesity treatment are rejected each year due to the reliance on a single measure of change (weight reduction) to account for a multifaceted treatment success. Thus, the intricacies in treating the problem of obesity cannot be known through this simplistic and unrealistic approach to measurement. Nonetheless, a great many researchers continue to rely upon a single dependent measure or a "stock" package

of dependent measures without questioning such fundamentals as reliability, validity, comparability, and dimensionality of focus.

This general tendency continues although there have been several attempts to help organize and improve research methodology for various habit or impulse control disorders: alcoholism and drug abuse (Miller, 1977; 1981; Sobell & Sobell, 1976; Sobell, Sobell, & Ward, 1980); eating disorders (Brownell, 1981; Wilson, 1978); tobacco smoking (McFall, 1978). Each review contains a "state of the art" examination of research methodology for their respective topic. Although some of these reviews contain a detailed summary of dependent measures (e.g., Brownell, 1981; Sobell, Sobell, & Ward, 1980), the majority focus on a large variety of methodological issues; as a result, generalities are fostered rather than useful specifics. Moreover, each is largely concerned with assessment from a single dimension of measurement: behavior. Those researchers who look to these reviews as a source for dependent measure selection come away with a hazy notion as to which assessment strategies are necessary, appropriate, valid, and economical. Thus, a review of outcome methodology with habit disorders which focuses on evaluation, dimensionality of measures, and recommendations for dependent measure selection is needed.

The Habit Disorder Concept

The label of habit disorder has been a catchall term for a variety of loosely related symptoms of external as well as internal etiology. Unlike other diagnostic categories, the habit disorder lacks

a clear consensus of symptoms and processes of the disorder. As a consequence, classification systems have had difficulty in placing disorders of this type within an independent category. These systems, for the lack of a better approach, have deemed it more efficient to categorize habit disorders from the major symptom exhibited. The recent publication of the Diagnostic and Statistical Manual of Mental Disorders-III reflects this trend. Traditional habit or impulse related disorders are widely dispersed under such categories as ing disorders, stereotyped movement disorders, substance use disord other disorders with physical manifestations, and disorders of lse control not elsewhere classified (American Psychiatric Associat 1980).

Traditional attempts to define a habit disorder have largely focused on a behavioristic or psychoanalytic explanation. For example, the behaviorists emphasize the acquisition of habits; that is, a stimulus and response must be spatially and temporally associated, and that the response must be followed by a positive consequence. Thus, one may find a lecturer who is just about to deliver an important speech (stimulus) -- he lights up a cigarette (response) -- tension is released (positive consequence). From an analytic perspective, habit disorders are thought to reflect unconscious conflict from the developmental past. The performance of the habit sequence can temporarily reduce the level of conscious anxiety. Both of these explanations are very general in scope, leaving a vague impression of origins and processes.

Without a clear conceptual framework, it is not surprising to find considerable variability between sources in determining habit disorder symptomology. Regardless of theoretical orientation, the symptoms most commonly cited are repetitious behavior, heightened tension, sudden tension release, high anxiety, psychological dependency, unrealistic thoughts, irresistable impulse, self-destructive tendencies, loss of personal control, and low self-worth (American Psychiatric Association, 1980; Freedman, 1975; Kolb, 1977). There is a tendency in the compilation of symptoms to bifurcate these manifestations into external and internal realities, favoring one reality over the other. Furthermore, one side of the external/internal dichotomy is often considered to be incompatible or irrelevant depending upon one's theoretical orientation. However, it is this writer's contention that each reality is an essential aspect of the total habit disorder syndrome, and that the interrelationships of these symptoms can be better conceptualized within three primary dimensions of human functioning: conation, cognition, and affection. This tripartite paradigm contains three independent dimensions which combine to form a complex, interactional system of human functioning. To understand this process more fully, its philosophical underpinnings will be briefly explored, and then applied to a conceptualization of the disorder.

A Tripartite Foundation

Empirical materialism was a dominant force in early Greek philosophy (Sahakian, 1975). It was believed that the proper study of

the universe was through observation and experience; moreover, reality can be only understood by reducing phenomenon to a basic, indivisible essence. In response to these notions, Socrates (470 B.C.) rejected the prevailing notion of reducing reality to a single dimension. He believed that ultimate truth comes not from the senses, but from within the individual through examination of the promptings of a universal unconsciousness, the repository of all knowledge. Thus, refusing a materialistic basis for knowledge, Socrates chose the soul as the key to understanding.

A tripartite system of functioning is best known through the work of Plato (427-347 B.C.), a student of Socrates. Plato accepted his mentor's precept that truth can be understood through the rational processes of the soul. With this idea in mind, Plato proposed that the soul is composed of three separate realities, all of which function in a complex interaction. In addition, these three dimensions permeate both the mind and body (Allport, 1954). Figure 6.1 illustrates the influence configuration of the tripartite model.

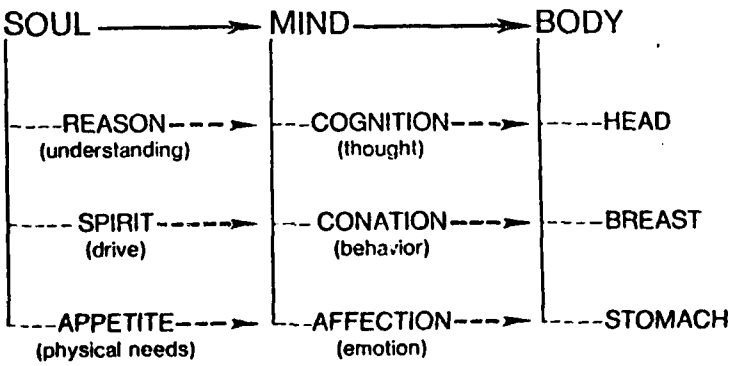

Fig. 6.1. Influence Configuration of the Tripartite Model.

Plato proposed that the soul functions in unity when harmony exists between each of the three dimensions. However, an imbalance or lack of harmony between dimensions results in maladjusted or abnormal manifestations (Sahakian, 1975). Thus, the "normal" individual is one who can integrate and maintain a positive balance between each dimension of functioning.

Plato's views had a lasting effect on another influential philosopher of the time. Aristotle (384-322 B.C.) advanced a tripartite reality very similar to Plato's. This theme is most evident in his conceptualization of an increasing dimensionality of existence as organisms become more complex. Aristotle believed that: plants grow (physical dimension); animals grow and sense (physical and affective dimensions); and humans grow, sense, and know (physical, affective, and cognitive dimensions). Although Aristotle accepted the view that only the physical dimension could be known, nevertheless, he did not deny the influence of non-physical dimensions.

The basic elements of Plato's tripartite reality provide a useful orientation in conceptualizing habit disorder symptoms and process. In terms of symptomology, the manifestations of habit disorders can be roughly placed within one or more of the three dimensions; however, it is important to realize that this is an artificial categorization, and does not represent the complex interaction of dimensions which is always present. Table 6.1 specifies the dimension or dimensions most characteristic of each habit disorder symptom based upon the descriptions of symptom components from varied diagnostic sources (e.g., American

Psychological Association, 1980; Freedman, 1975; and Kolb, 1977). To conceptualize the habit disorder process in one or two dimensions is thoroughly inadequate. The actual sequence of a disruptive habit follows a circular type of pattern: impulse----→ tension----→ release----→ impulse----→ etc. (American Psychiatric Association, 1980). Within this circularity, the individual can be operating in

Table 6.1

Habit Disorder Symptoms Classified in the Tripartite Model

SYMPTOM	FUNCTIONING DIMENSIONS		
	COGNITION	CONATION	AFFECTION
Anxiety			X
Tension	X		X
Tension Release (gratification)	X		X
Repetitious Behavior		X	
Unrealistic Thoughts	X		
Irresistable Impulse	X		X
Loss of Self-Control	X	X	X
Self-Destructive Tendencies		X	
Psychological Dependency	X		
Low Self-Worth	X	X	X

one or all dimensions at the same time, e.g., negative self-statements (cognition), feelings of guilt (affection), and uncontrolled behavior (conation). Therefore, according to this model, effective intervention should be undertaken within each realm of functioning.

To treat from a single dimension could result in a temporary reduction in the habit disorder cycle, however, long-term change is less of a possibility; and, as alluded to before, this is exactly what treatment planners are discovering.

Although the tripartite orientation provides a theoretical direction for the treatment and evaluation of habit disorders, there are a number of issues that must be ultimately understood: (1) can the reduction of human functioning into three realms of existence accurately reflect the complex interaction of the whole?; (2) are the three dimensions exhaustive in their coverage?; (3) are the three conceptual dimensions related directly to empirical dimensions?; (4) is one dimension more influential than the others? Future research must help to expand and clarify these important issues.

With or without the emergence of a multidimensionality in treatment, there must be a corresponding alteration in the dimensionality of outcome measures used to assess change. It is the purpose of this dissertation to thoroughly investigate the specifics of dependent measure selection for habit disorder research. Within the tripartite dimension of functioning, devices will be described, classified, and evaluated in terms of: (1) ease of administration; (2) dimension of measurement; (3) reliability and validity; (4) cost efficiency. Based upon these criteria recommendations for the selection of dependent measures will be made in terms of overall quality at the conclusion of this dissertation, and placed in rank order of preference. If measures are deficient in one or more areas of the tripartite model, proposals will be made for future research.

It is beyond the scope of this dissertation to investigate all manifestations which may fall within the parameters of a habit disorder label. In response to this dilemma, this writer has selected two disorders that are receiving considerable research attention of late: obesity and tobacco smoking. Each is a prime example of the problems covered within this section.

CHAPTER 2

OUTCOME MEASURES OF OBESITY RESEARCH

One negative by-product of the American affluent society is the ever-increasing prevalence of obesity. The National Center for Health Statistics has completed a lengthy survey of obesity prevalence rates for men and women in the United States. Their findings indicate an alarming increase in the percentage of overweight citizens in the 20-74 age bracket (U.S. Department of Health, Education, and Welfare, 1979). It was estimated that 18.4 million men were 10 percent above the desirable weights established by the Health and Nutrition Examination Survey (Hanes). In addition, 8 million men were classified as 20 or more percent overweight. The statistical picture is even more bleak for women. Approximately 23.4 million women are considered 10 percent or more above the desirable weight and 23.8 million are categorized as 20 percent or more above the desirable weight. In accordance with these estimates, approximately 73.6 million people or 29 percent of the U.S. population can be considered as overweight or more importantly, a serious health risk. Perhaps the increasing concern for the consequences of this disorder (e.g., U.S. Senate, 1977) has contributed to the recent surge of fad diets, and the establishment of a multimillion dollar weight loss industry. With the increase in methods and practices for losing weight, researchers have the formidable task of accurately measuring outcome, and specifying the necessary components of treatment packages.

The obese person is often ridiculed and burdened with labels such as weak-willed, lazy, and overindulgent. In reality, however, the phenomenon is much more intricate than this simple stereotype portrays. Obesity has been determined to be a product of genes, physical conditions, psychological problems (cognitions, emotions, and behaviors), and social pressures (Bray, 1976; Stunkard & Mahoney, 1976; Wooley, Wooley, & Dyrenforth, 1979). Under normal conditions, the body will maintain an optimum weight range; that is, the amount of calories consumed per day is equivalent to the energy-producing value needed to maintain bodily functions, exert activity, etc. However, it is an illusion to consider that a precise static condition for the weight of the human body exists. The so-called "ideal weights" proposed by insurance companies (Metropolitan Life Insurance Company, 1960) and the U.S. Government (U.S. Department of Health, Education, and Welfare, 1979) are gross, average estimates to account for internal as well as external fluctuations. For these agencies, this is an efficient means to gather data for their statistical purposes. However, a more precise concept of "normal" and "obese" is needed for methodological assessment.

Although body weight is the typical measure used to define the obese person, it is only an indirect measure of a body fat content. If body weight and the body fat percentage were perfectly correlated, this measure would be an acceptable assessment device; however, this is not the case. Muscle density, bone structure, and water weight fluctuations are all factors which can influence body weight. Nevertheless, body weights are easy to obtain and remain the standard

measure in weight reduction studies. The concept of obesity is more than a statistical cut-off level established by comprehensive surveys. It is a disorder that is composed of a complex interaction of internal and external variables, all of which must be considered to formulate a complete understanding. Since the epoch work of Stuart (1967), the literature has been inundated with weight reduction treatment packages which are largely behavioral in orientation. Several of these studies have been cited consistently to show impressive support for a particular treatment procedure, but most often contain serious methodological problems or lack clinical relevance (Wilson, 1978). The most frequent methodological violations are unidimensional dependent measures, invalid dependent measures, inadequate short-term follow-ups, and the lack of comparable control groups (e.g., Abrahams & Allen, 1974; Balch & Ross, 1975; Mahoney, 1974b; Manno & Marston, 1972). Perhaps as a consequence, obesity studies typically fail to hold up under replication. Bellack and Rozensky (1975) have specified three problem areas in the selection of dependent measure which may be contributing to non-replication: measures that are incompatible with data analysis; a lack of multiple criterion for measuring all important effects of treatment; and a lack of standardization of dependent measures across studies. The last two problems are of paramount importance to improve the accuracy and quality of obesity outcome research; to remediate these, the following evaluation is directed.

The measurement devices in the forthcoming sections will be classified and reviewed within the three dimensions of the tripartite

orientation. The conation dimension will include all measures which focus on assessment of external phenomenon, e.g., behavior, physiological reactions, etc. The cognitive dimension will contain those measures of subjective thought processes. Within the affective dimension category, devices will be reviewed that attempt to measure change in subjective feeling states. The cognitive and affective dimensions have been combined in a single section due to the limited number of measurement devices currently available. This section will be presented following reviews of the conation dimension in obesity and tobacco smoking research.

Measures of Obesity: Conation Dimension

Body Fat Determination: The single most popular measure in obesity research is the calculation of weight reduction. This procedure is based on the assumption that a reduction in body weight signifies a corresponding change in the level of body fat. In most cases this is true, but not always. As elaborated previously, other metabolic factors significantly influence fluctuations in weight. Therefore, weight reduction calculations are not totally sufficient to measure body fat levels. However, this device is helpful in providing general change data, and in providing feedback about the subject's progress.

The least acceptable, but most common, of any weight measure is the recording of absolute pounds lost. Without a comparison of pretest weight levels, the magnitude of change is lost, e.g., a 10-pound weight loss is more significant for a person weighing 140 pounds pounds than a person weighing 300 pounds. Another popular method is

the change in percent overweight. This dependent variable is a percentage derived from the actual weight exceeding the ideal weight from pretest to posttest. Although this measure is more accurate than absolute pounds lost, it possesses two major difficulties: body weight is assumed to be an accurate measure of body fat; and, ideal weights are based upon national normative statistics listed in insurance companies or government weight/height tables. LeBow (1977) has been a critic of these weight-loss based dependent measures. For example, a gross body mass measure cannot differentiate the subtle influences of water weight, muscle mass, bone structure, and body fat. Such factors can produce misleading results. In addition, reliance upon a standard weight/height chart for establishing an ideal weight is laden with difficulties. Typically, such charts use a frame size criteria (small, medium, and large) without specifying precise guidelines for determination. Furthermore, there is indication that insurance companies are economically biased to underestimate national norms (Mayer, 1968; Simms, 1977), and therefore propose lower ranges of normative body weights.

The use of relative weight indexes has shown promise as an indirect measure of body fat. These indexes are usually expressed in a ratio of weight-to-height. Keys, Fidanza, Karvonen, Kimura, and Taylor (1972), for example, conducted a concurrent validity study to compare the weight/height ratio, body mass index (weight/height squared), and the ponderal index (cube root of weight divided by height) to more precise measures of body density and skinfold thickness. The body mass index proved to be slightly more accurate in

estimating body fat while the ponderal index was least accurate. Although correlations were strong between the body mass index and measures of skinfold thickness (r_s = .7 to .8 range for all groups), it is not sufficiently accurate to use as a single measure of body fat content.

Feinstein (1959) has formulated a weight reduction index to avoid the typical weight measure pitfalls. In this formula, a variety of important factors, pounds overweight, target weight, initial weight, and absolute pounds lost are taken into account:

$$\text{Weight Reduction Index: } \frac{\text{Pounds Lost}}{\text{Pounds Overweight}} \times \frac{\text{Initial Weight}}{\text{Target Weight}} \times 100$$

This formula is quite useful because it takes into consideration the great variability of body weight among obese subjects (Wilson, 1978). A heavier subject must lose more pounds to reach the same percentage of the target weight goal. Thus, it provides a more conservative but meaningful estimate of treatment effects. However, as with the change in percent overweight strategy, part of this formula must rely on the nebulous concept of ideal or target weight. Originally, Feinstein (1959) suggested that target weights should be determined by either a national norm chart or by the participants' subjective view of an ideal body weight. From the above discussion on weight/height tables, this writer suggests caution in their selection as an ideal level of weight until some of the major flaws are corrected. The use of the participant's subjective view appears to be a viable alternative. By using a subjective estimate of target weight, the resulting weight reduction index will have greater meaning and relevance to the subject

rather than artifically contrived norms. Without considering the subject's point of view, the investigator may assume a weight reduction success; when in fact the subject views the results as a dismal failure. Perhaps an acceptable compromise would be to compare the results of both subjective and ideal target weights.

In summary, body weight measures are easy to calculate, economical, convenient, and provide general measures of weight change that are easy to comprehend. Nevertheless, body weight measures are only moderately accurate in predicting body fat percentage (Rogers, Mahoney, Mahoney, Straw, & Kenigsberg, 1980). In addition, these measures lose much of their accuracy with grossly obese subjects or when special groups are the focus of study, e.g., children and the elderly (Wilson, 1978). The logical solution is to include a more precise measure of body fat percentage.

The most common method of deriving a body fat percentage is through the use of a skinfold caliper. This method is considered by many sources to be a reliable and accurate instrument (Bray, 1976; Durnin & Rahaman, 1967; Franzini & Grimes, 1976; Grimes & Franzini, 1977; Haisman, 1970; Sims, 1977). There are three calipers which are widely used for this type of measurement: Best Caliper (Best, 1954); Harpenden Caliper (Edwards, Hammond, Healey, Tanner, & Whitehouse, 1955; Tanner & Whitehouse, 1955); and Lange Caliper (Lange & Brozek, 1961). In a comparison study of these instruments, Sloan and Shapiro (1972) found no significant difference between caliper readings; however, the Harpenden was the most consistent. After a careful review, Grimes and Franzini (1977) recommend the Lange Skinfold

Caliper (Cambridge Scientific Industry, Cambridge, Maryland) as measure of body fat. This model has easy accessibility in the United States, a greater measuring range capacity, it is smaller, and less expensive (approximately $150); hence, these qualities earmark the Lange Caliper as the best instrument of choice. A recent study by Franzini and Grimes (1980) illustrates the use of a Lange Caliper assessment in addition to gross body fat measures.

The major problem with skinfold measures of fat percentage is their reliability (Burkinshaw, Jones, & Krupowicz, 1973; Wormsley & Durnin, 1973). Nonetheless, consistency can be achieved through careful implementation of measurement procedure (Durnin & Rahaman, 1967; Johnson & Stalonas, 1977; Weiner & Lourie, 1969). Using the following procedures will increase the value of skinfold measurements. The simplest and most economical way of selecting and measuring body fat was proposed by Durnin and Rahman (1967). First, measurements should be read from the right side of the body; however, Womersley and Durnin (1973) found no significant variations between either side. Second, to insure accuracy, all measurement readings should be taken from the tricep, bicep, suprailiac, and subscapular regions (Burkinshaw, Jones, & Krupowicz, 1973; Durnin & Rahman, 1967; Durnin & Womersley, 1974; Weiner & Lourie, 1969; Womersley & Durnin, 1973). Third, the final measurement is composed of repeated readings until two are within five percent agreement. The average of these two measurements are recorded as the final reading for that particular site. Womersley and Durnin (1973) found that the greatest

reproducibility of measurement is from the total areas of skinfold thickness.

A second important drawback to the skinfold caliper technique is difficulty in measuring morbidly obese people. With these subjects, it is exceptionally difficult to reliably locate, isolate, and measure fat tissue; however, for the majority of subjects this will not be a problem. Although obesity criteria using a body fat percentage varies, it is generally thought that obesity in men ranges from 20-25 percent body fat; for women, 25-30 percent body fat (Human Performance Center, 1980).

The most accurate measure of body fat is by far the most expensive and cumbersome to administer. Based upon Archimedes' (287-212 B.C.) principle of hydrostatic displacement, this method measures body density which then is converted to a body fat percentage using a simple formula. Katch, Michael, and Horvath (1967) describe a practical and very reliable (test-retest, $r = .87$) method for accomplishing this measurement. After a reading is obtained for both dry and submerged body weights, body density can be calculated from the following formula:

M/V (mass per unit volume) = Ma (weight of the body in the air)
minus Mw (weight of the body submerged)

Using a regression formula derived by Brozek, Grande, Anderson, and Keys (1963), body density can be converted to a more useful body fat percentage:

$$F\% = 100\ (4.570/DENSITY - 4.142)$$

As one may deduce from the brief description of this measurement, the necessary equipment (e.g., water vat or pool, scale, carriage, and snorkel) is very expensive. In addition, the inconvenience and embarrassment of being stripped, hoisted, and dipped is not conducive for happy subjects, and may increase the bias in samples and attrition rates. Therefore, this method is more properly used with experimental studies that require precise body fat percentages.

Observations -- Measures of Eating Behavior: The observation of eating style can provide two-fold information on the components of eating behavior as well as measures of change in outcome research (Brownell, 1981). Although important data is derived from a component analysis of eating behavior in obese and non-obese subjects, this section will focus attention on the use of these measures in determining outcome. Objective measures of eating behavior can be roughly viewed in two category types: experimental analogue and naturalistic or quasi-naturalistic observation.

The laboratory traditionally has been considered an ideal place to provide the necessary experimental control in evaluating behavior; however, certain drawbacks exist with this approach. These problems will be specified later. The most frequently used measures of eating behavior are the taste-rating task and the food presentation machine.

In a widely cited study, Schachter, Goldman, and Gordon (1968) developed a taste-rating task measurement that has proved wide applicability for the measurement of ingestive habit disorders in a laboratory setting, e.g., tobacco smoking (Briddell, Rimm, Caddy, &

Dunn, 1979), and alcoholism (Connors, Maisto, & Sobell, 1978; Cooper, Waterhouse, & Sobell, 1979). In this study, subjects were told that the experiment was a tasting test of various brands of crackers. Before hand, two groups (randomly assigned obese and non-obese subjects) were given either a sandwich or nothing at all. Each subject later was asked to rate certain taste dimensions from five bowls of crackers on a prepared rating list. Subjects were cautioned not to eat before the experiment time. By counting the number of crackers consumed, Schachter found that the obese are less aware of stomach signals of fullness. Thus, he concluded that the eating behavior of the obese is partially dependent upon external cues. Schachter has used this method repeatedly in investigating the influence of environmental factors on eating behavior (Goldman, Jaffee, & Schachter, 1968; Schachter & Gross, 1968; Schachter & Rodin, 1974). The taste-rating method has been further modified to help identify eating topography (Mahoney, 1975; Diament & Wilson, 1975).

There have been a few attempts to measure eating behavior through the use of machine dispersal systems; however, the practicality and expense of such a procedure has been prohibitive. Jordan, Wieland, Zebley, Stellar, and Stunkard (1966) attempted to measure subject consumption levels by passing liquid meals through a glass straw. By the use of this device, precise ingestion levels can be monitored. Recently, a Universal Eating Monitor was developed to assess amounts of food consumption by subjects (Kissileff, Klingsberg, & Van Itallie, 1980). The weights of food presented to subjects can

be secretly monitored through scales placed within the eating table. This machine can precisely monitor liquid as well as solid foods.

The major problem with the experimental analogue methods described above is the artificiality of the situation. It is hard to imagine that eating behavior in laboratory experiments will closely approximate real life. Moreover, the demand characteristics of the situation will greatly influence behavior unless it is specified and controlled.

Because of the concern for laboratory findings generalization, investigators have moved into such natural settings as cafeterias (Dodd, Birky, & Stalling, 1976; Krantz, 1979; Krassner, Brownell, & Stunkard, 1979), luncheons (Adams, Ferguson, Stunkard, & Agras, 1978), and snack-bars (Coll, Meyer, & Stunkard, 1979; Gaul, Craighead, & Mahoney, 1975; O'Brien, Kelley, Rosenthal, & Theobald, 1978). These studies are designed to investigate the topography of eating habits rather than for measuring outcome change per se, e.g., social influences, type of food eaten, number of calories, number of chews, latency between bites, bite size, length of meal time, etc. Typically, precise time samples are taken to establish an estimate of a specific behavior per unit of time (Brownell, 1981). Effective observational studies require precise definitions of target behaviors to insure an acceptable level of agreement between judges. In addition, training sessions and in vivo practice runs are manditory to establish a high level of interjudge reliability (usually $r = .85$ or greater). In some studies, it may be more advantageous to use a quasi-naturalistic environment to improve observational accuracies.

To illustrate, if a study endeavors to investigate food selection and calorie levels of obese and non-obese subjects, a university cafeteria or any other eating establishment which meticulously measures food proportions would be more accurate than training observers to estimate food quantity (e.g., Dodd, Birky, & Stalling, 1976). The difference between the known weight of the food portion and the weight of the food fragments left would provide an accurate estimate of calorie intake.

The use of naturalistic or quasi-naturalistic observational settings has strong possibilities for the experimental investigation of eating styles. Nevertheless, this approach is not ideally suited for testing the efficacy of a treatment program. The complexity of establishing adequate controls is time consuming, and somewhat costly. Other approaches are much more cost efficient.

Energy Expenditure Measurement: In recent years, energy expenditure rates have become an important, but unclear component in weight reduction treatment strategies. Contrary to popular biases, obesity is not solely a product of an inability to control calorie consumption. The level of weight maintained by an individual is the result of a complex process of energy consumption and expenditure interaction. Although this relationship is not completely clear, some researchers speculate that the level of energy expenditure is a major factor in obesity (Bloom & Eidex, 1967; Epstein, Wing, & Thompson, 1979; Harris & Hallbauer, 1973; Mann, 1974; Wooley, Wooley, & Dyrenforth, 1979). Indeed, an energy expenditure treatment component is viewed as

essential for the continued maintenance of weight reduction (Dahlkoetter, Callahan, & Linton, 1979; Stunkard & Mahoney, 1976).

The measurement of energy levels is more complicated than one might guess. Energy expenditure is not only related to overt activity, but to the basic metabolism rate of the body (Bray, 1976). The basic metabolism rate (total minimal activity of body tissue under steady-state conditions) is influenced by a variety of factors, all of which remain unclear as to their specific contribution to the total level of energy expenditure (Brownell, 1981). Nevertheless, until energy levels are understood more clearly, researchers must attempt to investigate the influence of physical exercise on outcome data.

Calorie expenditure has been the main target of assessment for researchers. The most popular method of measurement, but least accurate, involves the use of self-report records. Despite their popularity, prior attempts at self-monitoring physical activity have been discouraging. Jeffery and Wing (1979) found that self-reported exercise was not a good predictor of weight loss. These investigators point out that an accurate measure of caloric expenditure requires precise evaluation of intensity and duration which is difficult to achieve; as a consequence, subjects had greater difficulty in deriving meaningful estimates of physical activity. For example, it is irrelevant to assign an expenditure value of two kilocalories per minute for a specific task. Each person will vary in the amount of effort put into the activity. Moreover, activity levels rarely stay within the confines of the task, thus, further confounding the intensity of the activity. If an average kilocalorie expenditure per

activity is utilized, the resulting measurements are subject to wide variations. Another problem with self-report energy measures is the lack of convenience for the subject. It is beyond practical boundaries for subjects to compartmentalize, temporalize, and measure the intensity of behavior. Clearly, a self-measurement of activity is not a precise method of assessment for this parameter of obesity research. It can only provide general information about the activity level of the subject during treatment.

Indirect physiological measurement provides a more precise assessment of energy expenditure. Previous attempts to estimate these levels have focused on total energy expenditure through carbon dioxide production, oxygen uptake, and nitrogen excretion (Brownell, 1981). As with most physiological measures, equipment is very expensive, and difficult to administer. Furthermore, the artificial insertion of such devices in a weight reduction program may produce biased effects on the energy expenditure activity.

Before accurate measurement of energy expenditure is achieved, future research will be necessary to -- a) delineate the contributions of the basic metabolism rate and physical activity; b) establish accurate, non-obtrusive devices. One possible direction for research is to set aside the notion of measuring total energy expenditure for a given activity and focus on complete measures of body conditioning such as heart rates, muscle tone and strength, and aerobic capacity. In the meantime, self-report estimates of activity can provide a less costly measure of energy expenditure influence.

Self-Monitoring Records: A subject's self-report has the potential for revealing a wealth of data which is virtually unretrievable by any other method. Conversely, the accuracy of such reports may be subject to conscious or unconscious distortions. Often, a subject will be influenced by the need to present a socially desirable front, thus biasing the recorded data. Another problem with this source of data is reactive effects. For example, the obtrusive measurement of data by the subject will not accurately reflect data gathered by unobtrusive means. As a consequence, self-report data must act as a supplement to other measurement sources.

Many obesity treatment programs incorporate the use of a self-monitoring log to isolate the factors involved in the subject's eating pattern. Such logs most often contain a daily record of body weight. Although this is a simple task to perform for the subject, there are a number of factors which render this data inaccurate. Subjects tend to be less than honest in reporting weights, especially if a hefty deposit hangs in the balance. Also, Wilson (1978) points out that spring-operated home scales are grossly inaccurate and tend to vary a great deal.

Nutritional quality has been another self-report source of data. Subjects record the types of food eaten per meal period. This information is essestial for studies that utilize nutritional education as part of the total treatment package, e.g., Beneke, Paulsen, McReynolds, Lutz, and Kohrs (1978); and McReynolds, Lutz, Kennedy-Paulsen, and Kohrs (1976). The self-monitoring of caloric intake is a very important source of data. For a minimal purchase,

subjects can obtain a small food scale and any currently published booklet on food/calorie conversions. A total caloric intake can be simply recorded each day. Several studies of obesity treatment research are including this measure as a matter of course (Green, 1978; Jeffery & Wing, 1979). Other sources of data in a self-monitoring log can include a means of recording pre- and postactivities of eating, pre- and postmeal mood checklists, eating durations, and social factors (e.g., people present and activities during the meal); all of which provide useful data in the overall day-to-day eating style of the subject. From these data, potentially destructive events can be identified and included in the treatment focus. However, it must be pointed out that the value of monitoring intervening behaviors (e.g., chewing behavior, calorie intake, exercise) for the purpose of specifying outcome is less certain. It would appear that in general they do not correlate highly with weight loss and therefore may be of no or limited value as outcome measures.

Comments

The final selection of obesity dependent measures from the conation dimension should reflect an overlap strategy; that is, each measure should provide a clarification of results, and cover the blind spots of other devices. Moreover, some less technical measures can be used to give a general level of progress feedback to the subject. For example, absolute pounds lost would be more meaningful to the subject while a weight index, paired with a skin caliper body fat percentage,

would provide a more accurate assessment of body fat level for the experimenter.

On the basis of the previous review, dependent measures for the conation dimension have been rank ordered in Table 6.2. These orderings are based upon overall quality from the criteria specified in Chapter 1. Nevertheless, these recommendations are made with caution. Future work is needed to ascertain the interrelatedness of these measures, and to establish their relative contribution in predicting outcome.

CHAPTER 3

OUTCOME MEASURES OF TOBACCO SMOKING RESEARCH

"Giving up smoking is the easiest thing in the world.
I've done it a hundred times." -- Mark Twain

Since the Surgeon General raised serious health questions about tobacco smoking, the prevalence rate of smokers in the United States has been steadily declining (U.S. Department of Health, Education, and Welfare, 1979). Data from a recent survey indicate, however, that one out of every three adults in the United States (33.7%) are still cigarette smokers. Nevertheless, these statistics do not reflect the contribution of other forms of tobacco consumption, e.g., pipes and cigars. Although the prevalence rates for male smokers have been on a steady decline since 1950, female smoker rates have remained remarkably constant (U.S. Department of Health, Education, and Welfare, 1979). With the heightened awareness of the potential health risk in tobacco smoking, the public is increasingly seeking professional help to overcome a most persistent and satisfying habit. As a result, the recent upsurge in tobacco research has focused primarily on studies of treatment outcome effectiveness (McFall, 1978).

Outcome studies on tobacco smoking cessation suffer from similar measurement problems as presented in the previous section on obesity: target behaviors are ill defined; the conation dimension dominates outcome measurement; measures have questionable reliability and validity; and measures lack comparability across studies. Without

a clear, comprehensive evaluation of measures, treatment outcome will remain contestable, leaving most treatment strategies without demonstrable utility.

Contrary to popular notions, tobacco smoking is not a simple progression of habit-forming behaviors. Smoking is best conceptualized as a complex phenomenon of physiological, social, and environmental stimuli (Bernstein, 1969; Hunt & Matarazzo, 1973) as well as mental constructs (Ferraro, 1973; Mausner, 1973) and affective states (Ikard & Tomkins, 1973; Tomkins, 1968). Consequently, treatment interventions are beginning to support and develop multicomponent strategies to accommodate the dimensional expansion of the tobacco smoking concept (Bernstein & McAlister, 1976). Before any certainty of intervention success can be achieved, each dimension must be assessed and compared in relation to the other dimensions of functioning.

The most difficult problem facing researchers of tobacco smoking outcome is the precise specification of target goals to insure reliability of measurement across studies. Too often these loosely formulated goals prevent an accurate comparison of treatment success. Each researcher must ultimately confront and resolve certain questions that are poignantly related to the success of failure of the study: Is there such a thing as a basic unit of measurement for smoking? Can it be assessed directly? Indirectly? What types of change can be deemed a success? Who is responsible for setting the target goal? Who is responsible for determining the outcome as a success or failure? When is the treatment outcome considered a success? The

following review will hopefully present directions so that the researcher can make a more informed decision on specifying and measuring target goals.

Measures of Tobacco Smoking: Conation Dimension

Tobacco Consumption Measures: A logical candidate for tobacco consumption measurement is the simple procedure of recording the number of cigarettes consumed per day. Indeed, the typical outcome study uses this calculation as the main device for consumption assessment. However, this measure is grossly misleading because it does not reflect the influence of important factors, e.g., subject's style of smoking (number of puffs, amount inhaled, length of time inhaled, etc.), nicotine concentration levels (filter vs. non-filter), and cigarette length (Frederiksen, Miller, & Peterson, 1977; McFall, 1978). To help control for some of these problems, Rapp, Dusza, and Blanchet (1959) suggested a weight measurement of tobacco smoked. This procedure involves the preweighing of the cigarette and a postweighing of the discarded remnant. The difference can be readily calculated to provide a percent measure of tobacco consumed. Although this method is more accurate than counting cigarettes, it falls short in accounting for the influence of the subject's style of smoking. As it stands, this strategy of measurement is suitable only as a general indication of tobacco consumption. It must be supplemented with other measurements.

A more precise measure, albeit indirect, is the assessment of chemical components and/or physiological metabolites of tobacco

products. More specifically, four areas of measurement have shown promise as a biochemical index of tobacco consumption: carbon dioxide levels; nicotine/cotinine levels; thiocyanate levels; and carbon monoxide levels. Each will receive an indepth examination.

The least accurate physiological measure is the level of carbon dioxide (CO_2) in the blood. Cahoon (1971) first proposed that chronic smokers have higher than normal CO_2 levels due to the irregular breathing patterns of smoking. In conjunction with these unusual breathing habits, cigarettes contain chemicals which increase the metabolation of carbon dioxide. Furthermore, CO_2 is maintained at higher levels in smokers due to its psychologically addicting qualities, e.g., the reduction of tension and anxiety. Thus, blood samples of smokers usually possess inordinately high CO_2 levels; however, a high CO_2 level is not exclusive in a smoking population. This index can be influenced by environmental factors, physical activity, etc. Another problem with this method is the expense of the chemical analyzing equipment. Unless an experimental setting contains such sophisticated analyzers the cost-to-benefit of CO_2 measurement devices are prohibitive.

The ingestion of nicotine is another addicting quality of tobacco consumption. Because this stimulant is a major component of tobacco products, and is less likely to be found in extraneous sources, it has the possibility of providing a reliable and valid index of tobacco consumption. Nicotine levels can be determined from two sources: the tobacco product and body concentration levels.

Estimates of tobacco smoking behavior can be readily accessible through the determination of nicotine level in tobacco products. By measuring the percentage of tobacco consumed, for example, and knowing the nicotine concentration levels of that cigarette (this information is provided for all consumers on the side of each pack of cigarettes in the United States), one can calculate a rough estimate of the nicotine consumption level; however, this measurement cannot account for the influence of the subject's smoking style. A more precise technique, and one which can account for certain aspects of the smoker's style, is the determination of a nicotine Mouth Level Exposure from discarded cigarette butts. This procedure has been used in the successful delineation of a smoker's topography (Ashton & Watson, 1970; Ague, 1972; Forbes, Robinson, Hanley, & Colburn, 1976; Robinson & Young 1980). Subjects are instructed to collect their cigarette butts in a plastic bag during a prescribed period of time. Each cigarette butt is dismantled to the filter wadding substance. Nicotine concentration levels in the wadding are determined by chemical analysis. Once this level is known, a Mouth Level Exposure can be calculated from the following formula:

$$M.L.E. = \frac{1 - e^{-(\text{known filter efficiency})}}{e^{-(\text{known filter efficiency})}} \times (\text{nicotine levels in cigarette butt})$$

The drawbacks to this method are obvious: subject collection of cigarette butts may have a reactive effect on data; analysis equipment

is expensive and complex; only filtered tobacco products can be used; and validity of measurement has yet to be determined. More accurate estimates of nicotine consumption levels can be achieved through the measurement of chemical presence in the body.

Concentration levels of nicotine in the body can be assessed by either blood or urine analysis. Each method requires the use of sophisticated gas-liquid chromotography equipment to assay levels of nicotine. However, urinary analysis sampling procedure is a more convenient method for the experimenter, and less painful for the subject. Some sources suggest that urinary nicotine detection has many more advantages than the more common method of assaying blood carbon monoxide levels which is discussed below (Paxton & Bernacca, 1979; Russell & Feyerabend, 1975). The advantages to the urinary nicotine assay are: skin puncture is not required, specimens can be frozen and tested in groups, values in smokers and non-smokers do not overlap a great deal, and reliable measures can be assayed up to 15 hours after tobacco consumption. Nonetheless, a serious drawback to this method involves the contamination of readings by extraneous tobacco smoke in a room. In fact, the presence of only one or two smokers in a room can produce significant levels of nicotine in the blood or urine (Russell & Feyerabend, 1975).

Zeidenberg, Jaffe, Kanzler, Levitt, Langone, and Van Vunakis (1977) have proposed the measurement of the nicotine metabolite, cotinine, as an indirect measure of nicotine in the blood stream. These researchers found that cotinine has a much longer half-life (30 hours) in the blood than nicotine (30 minutes). Also, greater

quantities of cotinine can be found in the blood. The assessment procedure requires a blood sample and a sensitive radioimmunoassay technique. Gas-liquid chromotography is the most widely used method (Langone, Van Vunakis, & Levine, 1975). In the preparation of samples, blood is distilled and assayed. As with all blood sampling techniques, equipment is expensive, procedures are complicated, and subjects are required to experience skin puncture.

One of the most promising biochemical assays in differentiating levels of tobacco consumption is thiocyanate determination. Thiocyanate (SCN) is the end-product of the body's chemical detoxification of cyanide compounds. Although the body contains normal levels of SCN to perform certain biological functions, elevated levels of this metabolite indicate an abnormal consumption of products which contain cyanide compounds, e.g., hydrogen cyanide gases in tobacco smoke. However, certain ingestive products (yams, broccoli, cabbage, turnips, horseradish, garlic, and some over-the-counter drugs) contain amounts of SCN which may contaminate results. Several studies have shown SCN determination to be an accurate method for differentiating smokers and non-smokers (Butts, Kuehneman, & Widdowson, 1974; Dacre & Tabershaw, 1970; Densen, Davidow, Bass, & Jones, 1967; Dogon, Amdur, & Bell, 1971; Tenovuo & Makinen, 1976), and as a measure of cigarette consumption (Brockway, 1978; Butts, Kuehnemann, & Widdowson, 1974; Tenovuo & Makinen, 1976).

In a recent review, Prue, Martin, and Hume (1980) comprehensively explored the various parameters of four potential sources of measuring SCN in the body: saliva, urine, blood, and

sweat. These authors found saliva SCN sampling to be the most sensitive test source; moreover, this method is much easier to implement and evaluate. Of the methods currently available for determining SCN levels in saliva, the colorimetric assays are the most accurate and cost efficient (Bark & Higson, 1963; Prue, Martin, & Hume, 1980). Levinson and MacFate (1969) provide a detailed description of the necessary spectrophotometer procedures.

The final method of measuring tobacco consumption focuses on abnormal levels of carbon monoxide (CO) in the body; another negative by-product of tobacco smoke. Carbon monoxide can be detected by two methods: the amount of CO absorbed in the alveoli of the lungs (alveolar CO); and CO absorbed in the blood stream (carboxyhemoglobin). Due to the inconvenience and expense of direct carboxyhemoglobin assessment, the alveolar CO breath sample has received greater research attention. Expired air CO values have shown a direct correlation with carboxyhemoglobin levels (Jones, Ellicott, Cadigan, & Gaensler, 1958; Stewart & Stewart, 1975).

Obtaining a reliable sample of expired CO is a persistent problem with this method. Jones et al. (1958) found the end-expiratory alveolar sample procedure to be the most consistent. The breath is inhaled for 20 seconds then exhaled, all from the resting state. A small portion of the exhaled breath is discarded; the remainder is blown into a polyvinyl bag. It is important to note that the use of any other type of collection bag increases the risk of sample contamination due to the possible presence of extraneous CO molecules (Horan, Hackett, & Linberg, 1978; Ringold, Goldsmith,

Helwing, Finn, & Schuette, 1962). Breath samples typically are estimated by a portable, non-dispersive infrared analyzer. In determining the CO level in the breath sample, the polyvinyl bag is attached to the analyzer where a metering pump extracts a measured flow of air. This air is passed over a sensor which oxidizes the sample into carbon dioxide. In this process, each molecule loses two electrons, producing a minute current flow that is amplified by the meter. The measurement is displayed on a meter in parts per million (PPM). Carbon monoxide analyzers are made by a number of companies in the United States, however, the Ecolyzer 2000 Series monitor (Energetics Science Inc., Elmsford, New York) has consistently demonstrated accurate estimates of carboxyhemoglobin levels (Blurton & Bay, 1974; Henningfield, Sitzer, & Griffiths, 1980; Hughes, Frederiksen, & Frazier, 1978; Stewart & Stewart, 1975; Stewart, Stewart, Stamm, & Seelan, 1976).

A recent review by Frederiksen and Martin (1979) proposes that carbon monoxide measurement is an essential device for determining the general risk of smoking as well as smoking behavior. Nevertheless, there are serious problems with this method that will require precise experimental control. Horan, Hackett, and Linberg (1978) specify a number of factors that may contribute to the contamination of CO measurements. First, ambient CO (e.g., smog) has the potential to affect both subject CO body level and the calibration of the machine. Indeed, even the congregation of a few smokers in relatively tight quarters can influence CO levels. Second, the individual's activity level can greatly bias measures of CO. Increased breathing rates will

cause a corresponding decrease in CO levels. Third, CO monitoring has a short half-life (2-4 hours). As time progresses, CO sensitivity becomes less accurate, thus limiting its versatility as a measure (Pechacek, 1979). Fourth, arbitrary environmental restrictions can confound measurement results. For instance, subjects may not be allowed to smoke in particular areas or under certain circumstances during the day. To help overcome some of these problems, the above authors suggest the following: readings of ambient CO levels should be checked during the assessment periods; assessment periods should be conducted in the evening, hopefully when ambient CO levels have diminished from peak hours; and each assessment period should be held at the same time. It also has been recommended that experimenters screen for alcohol consumption (Hughes, Frederiksen, & Frazier, 1978). Not only alcohol, but certain drugs can produce artificial elevations in a subject's CO level. Filters can be purchased from the manufacturer of the Ecolyzer to screen for alcohol; furthermore, drugs can be screened through subject interview.

One may deduce from the following review that a universal measure of tobacco consumption does not exist. In this writer's estimation, this is true. As such, measures of tobacco consumption must be complementary to one another; that is, each must provide verification and clarification of other indices to help cover blind spots. For example, not only can physiological measures help support the amount of tobacco consumed, but also provide a verification of other measures, especially self-reports (Frederiksen & Martin, 1979; Henningfield, Sitzer, & Griffiths, 1980; Lando, 1975; Prue, Martin, &

Hume, 1980). In the final recommendations (see Table 6.3), the selection of instruments will reflect this interdependence of measures.

Observations -- Measures of Smoking Behavior: Although the laboratory analogue provides strict control from many influencing variables of tobacco abuse, one must settle for a certain lack of real life representation (McFall, 1978). However, the decision to use the laboratory in lieu of a more realistic situation is dependent upon the type of experimental focus. For example, a study designed to investigate particular components of smoking behavior is better suited for a tightly controlled environment. Conversely, if treatment effectiveness is the experimental question, then a more real life circumstance is warranted.

Understanding the elements of smoking behavior has spawned a number of studies on the specification of smoking topography. By understanding the subjects' specific smoking behavior, the experimenter can control for differences which affect level of consumption. Moreover, some sources suggest that smoking topography can be used as a dependent measure for subjects who cannot or will not quit smoking entirely (Frederiksen & Martin, 1979; Frederiksen, Miller, & Peterson, 1977). Within this type of treatment strategy, it is important to isolate those smoking behaviors which are deemed a potential health risk. Frederiksen et al. (1977) propose five types of smoking behavior that can be included as part of a multiple measurement approach: interpuff interval; cigarette duration; puff time length; puff frequency; and percentage of tobacco burned. An

illustration of this measurement method is provided by Miller, Frederiksen, and Hosford (1979). These investigators used the above five topography measures, plus time of cigarette in the mouth, and time of cigarette in the hand, to examine the influence of social interaction in light and heavy smokers. It was found that more frequent and longer puffs were characteristic of light smokers when alone. Conversely, the total amount of smoke inhaled for light smokers was reduced in the social interaction condition. Heavy smokers were not influenced in either social condition.

Another frequently used analogue method is one which is modeled after Schachter's (1968) food taste-test described in the previous section on obesity measures. A description of the smoking taste-test is outlined by Levenberg and Wagner (1976). Subjects were told that they had been chosen to give opinions on several cigarette brands. To differentiate smoking topography, judges behind a one-way mirror rated such behaviors as number of puffs, the length of puffs, and interpuff intervals. In addition, cigarette remnants were weighed after the subjects left to accurately determine the amount of tobacco consumed per person. Briddell, Rimm, Caddy, and Dunn (1979) have criticized the smoking taste-test as a potentially non-obtrusive, non-reactive assessment device. Although this measurement strategy helps to isolate expectancy and attitudinal factors, there are certain validity problems that need to be resolved, e.g., the constricted nature of the lab and lack of social interaction. Before one can depend on the smoking taste-test measurement with any degree of

certainty, the resolution of these validity problems is essential (Briddell et al., 1979).

Although analogue methods lack generalizability to real life circumstance, the natural observation is typically deficient in important controls to alleviate data contamination. As a consequence, researchers must be very creative in devising measures which are non-obtrusive. The most common naturalistic measure is the employment of trained judges to accurately observe target behaviors. As with all measures of individual judgment, a reliability index is a must to establish levels of agreement. Measures of observed behavior must be precisely defined, and accurately measured in terms of time and/or frequency. A supplement to this observational data would be the measurement of the remaining smoking debris. For example, cigarette butts can be collected from an ashtray. This data can provide direct support for other observations.

McFall (1978) has specified a number of problems with the naturalistic observation method: 1) the monitoring of a subject's behavior without consent poses important legal and ethical questions; 2) smoking data will vary among subjects depending upon the location that a subject will frequent. Some environments will be more conducive for smoking behavior, e.g., a bar. Consequently, group data will be difficult to compare; 3) this type of study is difficult to conduct and rather expensive. Nevertheless, a naturalistic observation study, if carefully implemented, has the potential to provide a real life data supplement on smoking behavior.

Self-Monitoring Reports: Self-report monitoring contains a wealth of information about the subject's smoking habits in a day-to-day existence. While no other source can know more about a person than the subject himself, there are inherent problems with any self-report method. One of the major difficulties is the denial or distortion of data (McFall, 1978). Delarue (1973) found that 20% of the subjects who complete a smoking treatment program were guilty of inaccurate abstinence reports; a higher rate of 48% also has been noted (Ohlin, Lundh, & Westling, 1976). Measurement reactivity is another potential problem of self-reports. McFall (1970) compared the self-recorded data of two groups: one recorded the number of cigarettes smoked; the other recorded frequencies of resisted temptation. The results indicate that consumption rates and smoking frequency was significantly influenced by self-monitoring. From these data it was concluded that self-reports are reactive to what the subject is asked to monitor; however, the results of this study have been criticized on the grounds that certain demand characteristics limited the generalizability of findings (Orne, 1970).

There is general consensus that if a self-monitoring record is used, other measuring devices must be employed as a verification source (Briddell et al., 1979; McFall & Hammen, 1971), e.g., physiological assessment or collaborative reports.

Studies by Marston and McFall (1971) and McFall and Hammen (1971) have used a convenient self-monitoring method to gather mean daily smoking rates in the natural environment. Each subject maintained a 2 X 3 inch booklet which could be carried in the

cellophane wrapper of their cigarette packages. The data sheets contained spaces for name and date, including 24 blank squares to represent the hours in a day. With this record blank, subjects can record the number of cigarettes smoked per hour. In the McFall and Hammen study, subjects were instructed to purchase all cigarettes from the smoking clinic, thus providing partial independent verification of self-reported smoking consumption.

The recording booklets in these studies only supply a small portion of potential subject data. For example, self-recorded data also can include time of day cigarette smoked, time taken to consume cigarette, social situation (alone or in a group), environment (home, office, etc.), and mood. Although a log of this scope contains very important data, convenience and time are sacrificed. Furthermore, the chances of innaccurate recording become greater when a cumbersome amount of information is demanded of the subject. Nevertheless, a monetary contract system, where subjects are paid money from a deposit, can greatly improve accuracy by making pay-offs contingent upon properly filled-in reports.

Research has focused attention recently on the use of a self-report, indirect measure of the tobacco smoking habit. Schachter (1977) proposed that the assessment of nicotine addiction is an important component in outcome treatment effectiveness. In response to Schachter's study, Fagerstrom (1978) composed a face validity questionnaire to assess the degree of nicotine dependence. These questions were compared to the following withdrawal responses: body temperature change; increase in a regular smoker's heart rate while

smoking a cigarette; and increase in an ex-smoker's heart rate while smoking a cigarette. Modest correlations were found between the questions and withdrawal responses. Albeit superficial, Fagerstrom's questionnaire has definite possibilities as a self-report measurement of nicotine addiction. For example, this device would have less contaminating influence on treatment gains. A subject of long-term cigarette abstinence may be tempted to return to his or her habit if given a cigarette on follow-up to assess addiction levels. Further research is needed, however, to expand related questions, and to establish validity in this type of measurement device. One problem to overcome is the clarification of the addiction concept. Not all smokers, even heavy smokers, are physically addicted to nicotine (Schachter, 1977). Other psychological or social factors can maintain the smoking habit as well.

Informant Reports: The use of relatives and friends as observers can provide a valuable supplement to the subject's self-monitoring data. These people have direct access to the subject's undisturbed behavior in the natural setting. Unless collaborators are trained to make precise observations, however, this type of data only provides general information. To illustrate, Lichtenstein, Harris, Birchler, Wahl, and Schmahl (1973) used informants who verified smoking behavior of friends or relatives on follow-up to smoking treatment. This measurement strategy helped to validate self-reported estimates. Collaborator reports can never be relied upon as a major source of data in assessing smoking behavior until more is known about their

reliability. Observer bias and reactive effects can seriously influence the data (McFall, 1978).

Comments

The selection of dependent measures for tobacco smoking outcome research will require a similar overlap of measures as described in the previous chapter on obesity assessment. This overlap of measures is a necessity because each focus of measurement has weak points that must be covered by other devices. In terms of expense, physiological measures of tobacco consumption are limited for application unless analysis equipment is available or funds have been allocated for their purchase. Nevertheless, this thrust of measurement is an important adjunct to the overall measurement of tobacco consumption, and should be included as a matter of course.

On the basis of the previous review, dependent measures for the conation dimension have been rank ordered in Table 6.3.

CHAPTER 4

MEASURES OF THE COGNITION DIMENSION: OBESITY AND TOBACCO SMOKING

From this writer's review of the literature, it is interesting to note the overwhelming imbalance between measures of the conation and cognition dimension in habit disorder research. Cognitive measurement strategies are virtually non-existent in these areas, despite the general acceptance of a cognitive influence operating in disorders of this type (Freedman, Kaplan, & Sadock, 1975). This imbalance is still further indication of the strong unidimensional influence present in psychotherapy research.

Without a precedence set for cognitive measurement of obesity and tobacco smoking research, this section will explore the current methods of cognitive assessment, and relate them to the potential measurement of cognitive change in these treatment areas. Three general topics will be considered: mental dialogue measures; mental construct measures; and measures of self-perception.

Mental Dialogue Measures: One potentially rich source of cognitive data lies within the continuous stream of thoughts ever present in the conscious person. The basic assumptions behind this source of measurement are: (a) all people have distinguishable thoughts; (b) there are distinct differences in what and how people think; (c) there is a direct or indirect link between thoughts and actions; and (d) there is a qualitative difference in thoughts between those who

can adapt and those who cannot. It is these assumptions which are the cornerstone to the new strategies emerging in cognitive treatment. One area of particular note is the use of internal dialogue to acquire new skills or remove maladaptive ones, e.g., thought stopping (Wolpe, 1958; 1969), self-instructional training (Meichenbaum, 1977), and stress-inoculation (Meichenbaum, 1975; 1977). Even though these treatment procedures have demonstrated success with a variety of problems (e.g., Meichenbaum, 1977; Meichenbaum & Cameron, 1973; Novaco, 1976; Turk, 1976; Wish, 1975), there has been little attempt to customize cognitive measurement to aid in the confirmation of these results. However, Genest and Turk (in press) have recently initiated the difficult task of differentiating the possible sources of measurement for subvocal dialogue, or what they refer to as "Think-Aloud." Although several internal dialogue measures are considered in their chapter, this writer believes that the continuous monologue techniques (private speech) have good measurement potential in obesity and tobacco smoking research.

The basic continuous monologue strategy is a very straightforward procedure. While the subject is involved in the performance of a prearranged activity, the experimenter invites him or her to verbalize all mental content as it becomes conscious. Once the subject is alone, engaging in the prescribed activity, the free-flow of speech is assumed to reflect the individual's "private speech," or those sequences of events available only to the subject. It is important that the monologue be recorded as unobtrusively as possible; thus, a concealed audio or video recording instrument would

be the instrument of choice, although certain ethical problems must be considered.

Due to the overwhelming abundance of verbal material produced in even a short period of time, the experimenter has a formidable task of analyzing the data. Genest and Turk have proposed three possible methods to do so: formulate overall indices through the global ratings of the monologue by judges; select blocked time segments whereby judges can rate dimensions of experimental interest; and select segments based upon a naturally occurring unit, e.g., sentence structure, changes in content, pauses, content change, or ideational change. However, none of these analytic procedures are devoid of problems. For instance, global ratings are more prone to distortion effects (demand characteristics) than ratings of smaller unit segments. Moreover, the reliability and validity of global ratings are reduced substantially unless precise specification of targets can be attained. With blocked time segment analysis, important data is lost in the artificial selection of time periods, e.g., the overall thought sequence. The third method of analysis is a very complex rating procedure, and therefore is more difficult to maintain agreement on the specified natural units unless paralinguistic cues (pauses, tone, speed, etc.) are present; thus, Genest and Turk suggest that reliability can be improved if raters are supplied with both audio or video tape and a transcript of the monologue. While each analysis method has positive and negative features, the ultimate selection of analytic procedure is dependent upon what the experimenter is interested in knowing.

Although cognitive dialogue measures have not been used in habit disorder research as yet, a direct application can be made to both obesity and tobacco smoking disorders. For example, an obesity researcher may be interested in the changes of private speech over the course of a subject's treatment. Recording pre- and posttest measurements during an actual meal, the subject is instructed to think about the foods eaten, and verbalize these thoughts as they occur. Once recorded and transcribed, judges can select time segments and rate the subject on predetermined dimensions such as positive or negative self-statements, time devoted to food dialogue, statements reflecting self-control or impulse, etc. A similar procedure can be used with the tobacco smoking subjects. The researcher may be interested in the progression of thoughts over the entire sequence of smoking behavior. Therefore, samples of thoughts can be taken from three distinct periods: (a) preparations to smoke; (b) smoking; (c) termination of tobacco product. The dialogue can be rated from similar dimensional terms of experimental interest such as cigarette related content.

As with any new measurement strategy, further research is needed to expand and refine its assessment potential. Nevertheless, this device suffers from the inherent deficiencies of all self-report devices: distortion of data, omission of data, and reactive effects. Moreover, Genest and Turk specify that the continuous monologue verbalization techniques also can be influenced by: (a) subject's inability to verbalize a thought; (b) the artificiality of the imposed task; (c) subject self-consciousness; and (d) subject selection bias

(simultaneously occurring thoughts are under the selecting discretion of the thinker. An overlearned, trite, or easily defined thought has a greater chance of being verbalized than those more related to experimental interests). With these limitations, the continuous monologue technique is not an independent measurement source; rather, it is a possible adjunct to other cognitive measures to help clarify the totality of change within cognitive processes.

Mental Construct Measures: Along with the myriad of external changes occurring from therapeutic intervention, there are corresponding changes in the way a person will perceive, organize, integrate, understand, and predict his or her world. Old beliefs or constructs about the universe, e.g., "I am a popular person when I am fat and jolly," or "I am more confident when I have a cigarette in my hand," are continually influenced by events which invalidate the maintenance of these constructs, therefore necessitating a change in the way these events are anticipated. As such, it is of great research importance to systematically observe changes in the way subjects will construe themselves in relation to their changing perceptions of food, cigarettes, tension, depression, people, body image, and life in general.

Mental construct theory is largely attributed to the prolific work of George Kelly and his students at Ohio State University. In this theory, Kelly rejected the notion that man is a passive recipient of incoming data. Rather, man is much like a scientist, one who makes observations, forms predictions, and tests hypotheses. By using these helpful capacities, man can formulate constructs which remove

contradictions and confusion, and restore regularity to life. Constructs are the controls of order. They lock the individual into a fixed action course. If the individual has the ability to continually incorporate new elements into his or her construct system, the capacity to anticipate the replication of events is enhanced. However, psychological difficulty begins to surface when the person repeatedly uses constructions that are consistently invalidated. Erroneously, the individual believes that problems stem from the elements of life rather than his/her construction of them, e.g., "I feel comforted and loved when I am full of food."

Constructs are not isolated entities, rather, they form a system wherein each is related on various levels to form a complex hierarchy. Each successive level of this hierarchy becomes more cognitively abstract than the previous one, e.g., the lower order construct of "unselfishness" can be incorporated or subsumed under the more abstract construct of "loyalty." Kelly believed that all construct systems are composed of a finite number of dichotomous beliefs, for this is the basis of determining all elements as similar or different; thus, constructs take on meaning when two elements are viewed as similar when contrasted to a third. This construct proposition is the very essence of Kelly's methodological procedure for measuring construct systems. A more detailed understanding of Kellian theory can be found in a two-volume book entitled The Psychology of Personal Constructs (Kelly, 1955).

The Role Construct Repertory Test (REP Test) is a device that systematically examines an individual's construct system through the

use of a matrix technique. The most outstanding feature of the REP Test is its versatility in design and application (Easterby-Smith, 1980). Although the REP Test was originally designed and applied in individual therapy situations, matrix grids have been modified and applied to other settings such as business management, education, and communications (Collett, 1979; Edwards, 1980; Shaw & Thomas, 1978; Slater, 1980).

Even though most Repertory Grids are rather formidable looking, these devices are easily understood when broken down into basic components: elements (located on the matrix columns); constructs (located on the matrix rows); and a system connection (located in the squares which comprise the grid). Figure 6.2 is an example of a 10 x 10 basic grid.

The elements of a grid are defined as those entities which represent the parameters of the material sought after, e.g., roles, statements, concepts, etc. The number of eliciting elements is only as limited as the creativity of the grid designer. However, Easterby-Smith (1980) has suggested two important rules which govern the selection of elements. First, all elements must be homogenous, i.e., do not mix categories of elements. Second, the elements should represent all facets of the investigative area; both good and bad qualities should be evenly represented to reduce the possibility of a

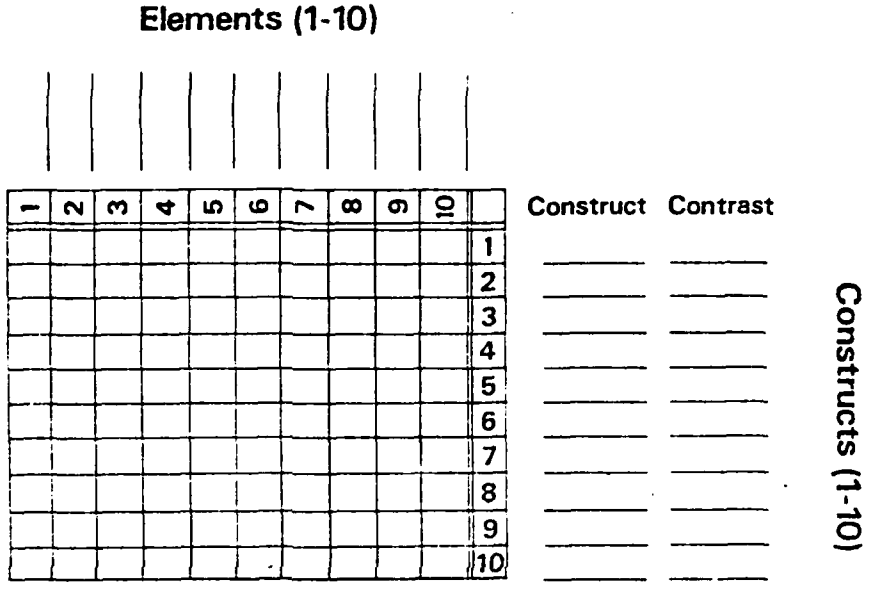

Fig. 6.2. A basic 10 x 10 REP Grid.

biased grid. As to the number of elements in a grid, no set number is manditory. While one source indicates that an eight-element, eight-construct grid is the minimum size for statistical evaluation purposes (Collett, 1979), others suggest that grids can provide high quality data with a 40-element, 40-construct grid (Edwards & Johnson, 1981; Bennion, 1981).

The constructs of the grid are defined as the stylized way the subject discriminates and groups elements to form a belief. In the typical process of eliciting constructs, the subject is requested to attach a cognitive label to the generated belief. This is accomplished by using Kelly's triad elicitation of meaning: compare

the similarity of two elements as contrasted to a third. One drawback to this approach involves the time length in establishing constructs. Some people have difficulty in communicating a construct, often preferring to settle for a superficial or stereotyped one, e.g., construct: "man"; contrast: "woman." One strategy to overcome this problem is for the experimenter to supply the constructs or evenly split them between elicited and supplied ones (Easterby-Smith, 1980). The experimenter must take great pains, however, to insure that the supplied constructs are representative of the experimental parameters.

The system connection component is defined as a strategy used to show how elements and constructs are connected. There are three types of procedures to achieve this purpose: dichotomizing, ranking, and rating. In the dichotomizing method, three elements are selected whereby two elements are determined by the subject as similar as contrasted with the third. Once the construct and contrast have been communicated, all other elements are categorically split into being more like the construct or more like the contrast. Traditionally, circles are made in the grid squares to specify the three comparison elements. "X's" through two of the circles designate similarity while a blank circle indicates a contrasting pole. Check marks are used to specify all other elements that are more similar to the construct; blanks denote contrast similarity. This type of system connection was first proposed by Kelly (1955), and is most widely used in therapy. The ranking method involves the rank ordering of elements as they pertain to each construct; thus, for example, a lower number indicates similarity to the construct while a higher number indicates similarity

to the contrast. The rating method is the most popular of all the system connection techniques. Shaw (1980) points out that about 70% of all grid studies use a rating method. A rating grid is derived by specifying a set number in a rating scale with the assumption that each number has equal gradation between the construct and contrast poles. Slater (1980) is an excellent example of a study that utilizes a rating system. In this experiment, statements by pro-I.R.A. (Irish Republican Army) factions were compared with the statements by anti-I.R.A. advocates. Statements (elements) were compared and rated on a scale where +3 indicated that the statements meant exactly the same and -3 indicated that the statements were exactly opposite. Numbers in between this range signified graded levels of agreement or disagreement. Through this manner of analysis, data can be supplied to both factions that helps them better negotiate their position.

Once the grid has been completed, the matrix is now ready for statistical analysis. Originally, Kelly and his students spent many arduous hours scoring the grid by hand. With the advent of sophisticated computer procedures, however, computer analysis of the grid provides more information, greater accuracy, and cost efficiency; several grid analysis programs are now available, e.g., ARGUS (Shaw & McKnight, 1980), CORE (Shaw, 1979), DXTX (TM)© (Edwards & Johnson, 1981), DYAD (Keen & Bell, 1980), FOCUS and PEGASUS (Shaw & Thomas, 1978), and INGRID (Slater, 1977). There are two types of statistical analysis used by the computer to extract information from the grids: principal components (Slater, 1977) and cluster analysis (Atkins, 1974). Each presents a unique and useful way of reviewing data. The

principal component analysis delineates the greatest variations within the grid and plots these variations on imposed mathematical axes. In a cluster analysis, high correlations within the grid are grouped together to form hierarchial trees. Although the computer analysis selection depends upon the type of information desired, it is this writer's opinion that the cluster analysis closely approximates Kelly's original view of hierarchial construct systems. An indepth discussion of these measurement systems can be found in Easterby-Smith (1980). For those investigators who desire a cluster analysis computer scoring of any grid type, or who desire consultation on the construction of grids, a service is now available for these purposes (T.R.I. Community Service Systems, 5402 Ruffin Road, Suite 100, San Diego, California 92123).

Traditional methods for establishing reliability and validity for the repertory grid have not been especially helpful. Reliability is most difficult to determine because of the very nature of constructs, i.e., constructs are subject to change or replacement when they are consistently invalidated. Nevertheless, some constructs (core constructs) are highly resistant to change and therefore relatively consistent over time. Fjeld and Landfield (1961) conducted a test-retest study of repertory grids over a two-week period. Reliability correlations were found between the .7 and .8 range. From these data, these authors suggest that REP grids remain relatively consistent because people use the same axes of meaning, even though the objects of these conceptual axes may change. Using a modified form of the REP Test to measure cognitive complexity (Bieri, Atkins,

Briar, Leaman, Miller, & Tripodi, 1966), Schneier (1979) conducted an investigation of the reliability and convergent/discriminant validities of this grid. The test-retest reliability results yielded a correlation coefficient of .82. When the grid was compared with other measurement devices of cognitive complexity and used to discriminate cognitively complex individuals, the results showed significant support ($p < .05$) for the grid as a valid measure. Among the limited studies conducted to investigate the REP Test grid as a measurement device, there is tentative support for its reliability and validity.

The versatility of the REP Test grid suggests that it may have useful application in the measurement of outcome change in obesity treatment and cigarette smoking. Subjects can be given several different types of grids to investigate important construct changes over the course of treatment. For example, to understand construct changes in obesity treatment, a grid can be designed to investigate the relationships of perceived roles to life constructs. The elements could contain such roles as self, mother, father, ideal self (the ideal self can be one person or a conglomerate of positive attributes from others), someone you know who is ideally trim, someone you know who is quite obese, someone who is impulsive, someone you respect, someone who is self-assured, someone you know who appears to have complete control over his or her life, and so on. The subject will mark the names of these people in each of the lines provided for elements (see Figure 6.2). As for constructs, the subject can generate these by the dichotomizing method or the

experimenter can supply important constructs related to obesity, e.g., *success*, happiness, satisfaction, critical, etc. Constructs are listed on the lines provided (see Figure 6.2). Subjects then place a check mark under the roles they feel are most closely associated to that construct. Each successive construct is connected to the elements in a like manner.

In cigarette smoking research, another example of grid construction is the rating of smoking related statements as they pertain to a specific goal, e.g., the elimination or reduction of tobacco consumption. The elements would contain an even split of both positive and negative statements about the smoking habit, e.g., "smoking is relaxing for me," "smoking may give me lung cancer," "I look sophisticated with a cigarette in my hand," or "I'm going broke due to the price of cigarettes." Constructs can be generated by the subject or provided by the examiner as illustrated in the obesity example. A seven point scale (-3, -2, -1, 0, 1, 2, 3) can be supplied to rate the level at which an element and construct reflects (3), or does not reflect (-3), the reduction or elimination of tobacco consumption. A pre- and posttest measurement could provide a cognitive sketch as to how the subject's statements or perceptions have changed.

The number and type of grids is only limited by the scope of the investigator and the confines of the experiment. However, this writer does not wish to give the impression that the REP Test grid is a catch-all measurement device; this is not the case. Further research is needed to firmly establish its utility in cognitive

assessment. Another limitation of this device is its overwhelming adherence to a single theory of personality. A rejection of the basic postulate and correlates of Kellian theory would render this procedure minimally useful.

Measures of Self-Perception: Past outcome treatment studies have demonstrated that obesity and tobacco smoking habit disorders are highly resistant to current treatment techniques, instilling feelings of frustration in the treatment planner, and most especially in the troubled person. In many cases, the habit disorder person feels helpless, unable to control or understand emotions, thoughts, and behaviors. Actions, such as "the midnight binge from the refrigerator" or the "desperate smoke in the bathroom," leave people feeling confused, ashamed, and lacking confidence. A lifetime of these typical scenarios can greatly affect how the person perceives himself, and whether this perception is positive. Negative self-perception has been especially problematic in obesity research where changes of body image do not always reflect a corresponding change in self-esteem (Berblinger, 1969; Stunkard, 1976; Stunkard & Mendleson, 1967). Unless the treatment planner is aware of the subject's self-perceptions, he or she runs the risk of possible relapse due to factors such as a self-defeat expectancy. These possibilities suggest the need for accurate measures of self-perception.

Measures of self-perception are usually described within three popular terms: self-concept, self-esteem, and self-acceptance. Although these terms are often used interchangeably, subtle

differences do exist in measurement definitions (Crandall, 1973). Self-esteem is typically defined as a personal evaluation of oneself which reflects approval or disapproval (Coopersmith, 1967). Self-acceptance usually means the ability to accept oneself (Crandall, 1973). Self-concept is a term which generally describes many cognitive elements related to self-perception. It is this general overlap in terms that contributes to the confusion surrounding the utility of self-perception devices. Validity studies have provided ambiguous and often conflicting results. Nevertheless, Crandall (1973) has compiled a thorough review of 30 measurements that fall within a self-perception classification. After considering the available data on test construction factors (e.g., sample size, reliability, and validity), Crandall rank ordered these devices in terms of overall quality. It is beyond the scope of this section to present all of these measures. Therefore, five self-perception devices will be selected on the basis of high quality and are briefly described below.

The Tennessee Self-Concept Scale (Fitts, 1964) is a 90-item, self-report questionnaire which provides a global self-esteem score and a complex self-concept profile. The test items reflect five general self-perception categories: physical self, moral-ethical self, personal self, family self, and social self. Responses to the test statements are selected from a five-point scale; (5) is completely true, (1) is completely false. Advantages: (a) uses global and individual subtest scores; (b) lie controls are provided; (c) reliability is good (r_s = .7 to .9); (d) validity is fair-to-good

(r_s = -.61 to -.70); (e) commercially available (Counselor Recordings and Tests, Nashville, Tennessee); (f) can be computer scored. Disadvantages: (a) no control for social desirability; (b) non-independence of subscores.

The revised Janis-Field Feelings of Inadequacy Scale (Eagly, 1967) is a 20-question test aimed at direct inquiry of positive and negative self-perception feelings. The subject responds by selecting one answer on a five-point, Likert-type scale, e.g., very often ---- practically never. The majority of test questions are oriented toward self-esteem in social situations. Advantages: (a) easy to administer; (b) good reliability (r_s = .72 to .88). Disadvantages: (a) lacks systematic scoring system; (b) conflicting validity (r_s = .35 to .84); (c) lacks social desirablity and lie controls; (d) commercially unavailable.

The Coopersmith (1967) Self-Esteem Inventory contains 46 declarative sentences wherein the subject responds with either "like me" or "unlike me." Although this test was originally formulated for children, Coopersmith has produced an adult version. Self-derogation, leadership-popularity, family-parents, and assertiveness-anxiety, have been identified as the four main factors of this test. Advantages: (a) easy to administer; (b) has the potential to measure subcomponents of self-esteem, e.g., family and social; (c) good reliability (r_s = .90). Disadvantages: (a) fair validity (r_s = .60); (b) no systematic scoring system; (c) lacks social desirability and lie controls; (d) lacks adequate normative sample; (d) commercially unavailable.

Rosenberg's (1965) Self-Esteem Scale is a 10-declarative statement questionnaire which is designed to measure self-acceptance. The subject reponds by selecting from a four-point scale that ranges from strongly agree to strongly disagree. The 10 test statements are all directed at liking or admitting approval of the self. Advantages: (a) very brief; (b) easy to administer; (c) good reliability ($r = .85$); (d) large normative sample. Disadvantages: (a) unidimensional (only measures self-acceptance); (b) conflicting validity ($r_s = .56$ to $.83$); (c) no social desirability or lie controls; (d) commercially unavailable.

Index of Adjustment and Values (Bills, Vance, & McLean, 1951) provides a two-fold measurement: acceptance of self and self-ideal discrepancy. The subject is presented with 49 adjectives and is asked to rate these words along three dimensions: (a) "I am a(n) _____ person." (b) "How do you accept yourself as described by the first rating?" (c) "I would like to be a(n) _____ person." The subject rates how descriptive each sentence is from a five-point Likert scale; (5) very much to (1) very little. Advantages: (a) good-to-excellent reliability ($r_s = .88$ to $.91$); (b) provides comparisons between self and ideal self. Disadvantages: (a) fair validity ($r_s = .47$ to $.60$); (b) somewhat lengthy; (c) can be a complex task for some subjects; (d) the majority of adjectives are positive, therefore suggesting possible bias.

From the previous descriptions of the higher quality self-perception devices, many unresolved problems limit their usefulness as an outcome measure. Nevertheless, they still can

provide general indications of self-perception changes. All other problems aside, self-perception measures are rather simple, easy to administer measurements; all desirable qualities in a multidimensional approach to assessment.

Comments

Many problems remain to be solved before cognitive measurement becomes an integral part of habit disorder assessment. Ultimately, measurement devices must be formulated around the specific parameters of each disorder. This project will require an indepth investigation of cognitions which are characteristic of the disorder, the influence of cognitions in the maintenance of the disorder, and the interactive influences of cognitions with behaviors and emotions.

On the basis of the previous review, dependent measures for the cognition dimension have been rank ordered in Tables 6.2 and 6.3.

CHAPTER 5

MEASURES OF THE AFFECTION DIMENSION: OBESITY AND TOBACCO SMOKING

The role of emotions in the overall assessment of human functioning has not been entirely clear. Some researchers suggest that emotions are the central motivating force in human existence, permeating the characteristics of thoughts and behaviors (Messick, 1965; Tomkins, 1962). Based upon this assumption, change cannot occur then until relevant affect is altered (Tomkins, 1962). Indeed, affect is an important dimension in the overall context of human function; nevertheless, this writer is not certain whether any dimensions of the tripartite model exert precedence over others. As a tentative observation, it appears that each dimension is intricately woven into a complex totality, exerting complimentary and antagonistic forces in a manner which is not as yet fully understood. Thus, it is important to remember that the tripartite model is an artificial dissection of a "whole process" for the purpose of understanding change on a more concrete level; hopefully to provide a useful construct in the treatment and evaluation of habit or other disorders.

Research has identified several emotions characteristic of obesity or tobacco smoking, and several common to both. In obesity research, Stunkard (1957) has investigated the manifestation of "dieting depression" during treatment and later on follow-up. Several of his subjects experienced short periods of intense anxiety which

progressed into prolonged periods of depression. Stunkard concluded that dieting subjects may be vulnerable to emotional upheaval as the result of a significant life change. Thus, it appears that the actual processes of dieting and related issues can facilitate negative feelings, most noticeably of a depressive nature (Stunkard & Rush, 1974). Another fruitful area of investigation has been the specification of emotional response to food deprivation. Glucksman and Hirsch (1968) noted that food deprived subjects manifest a variety of unpleasant responses such as preoccupation with food, decreased sexual drive, irritability, anxiety, and affective lability. With these results in mind, Glucksman, Hirsch, McCully, Barron, and Knittle (1968) compared the emotional responses of people on a dieting program who were experiencing a similar form of food deprivation. Many of the same symptoms were present: anxiety; fantasies of food or eating; depression; diet breaking; sexual problems; and overestimation of body size. These results suggest that a variety of negative emotions as well as unrealistic cognitions are a natural consequence to a major change in one's life, and therefore should be carefully monitored to reduce the risk of relapse.

Similar signs of unpleasant emotional reaction have been noticed in tobacco smoking research. For example, brief periods of abstinence in people have evoked signs of anxiousness, inability to concentrate, tension, irritability, mild depression, and general feelings of being out of control (Clark, 1977; Social Research Incorporated, 1952). In addition, symptoms become more pronounced with greater degrees of tobacco consumption. Thomas (1973) found that

heavy smokers experience higher levels of depression and tiredness than light smokers or non-smokers. With increased levels of these negative emotions present, researchers have noticed a corresponding boost in levels of tobacco consumption or, in many cases, a "falling off the wagon" (Heimstra, 1973; Thomas, 1973).

This section of the dissertation will explore the various experimental avenues available for the measurement of the affective dimension. Special emphasis will be placed upon the assessment devices of depression, moods, and global indicators of psychological adjustment, although many of these measures will overlap to some degree.

Measures of Depression: Since a number of depressive symptoms have been found among obesity and tobacco smoking patients, some type of depression assessment must be included in the measurement package. Lewinsohn and Lee (1981) have identified several assessment orientations to accomplish this goal, e.g., behavioral observations, self-report depression scales, and rating of symptoms. In consideration of convenience, time, and expense, this writer has selected four quality self-report depression scales: Beck Depression Inventory (Center for Cognitive Therapy, Philadelphia, Pennsylvania); Depression Adjective Check List (EdITS/Educational and Industrial Testing Service, San Diego, California); MMPI-Depression Scale (The Psychological Corporation, New York, New York); and the Zung Self-Depression Scale (Merrell-National Laboratories, Cincinnati, Ohio). A further elaboration of these measures is not warranted in this section due to the indepth coverage of these devices in a chapter

to be published in the same volume as this disseration (See Moran and Lambert, in press).

Measures of Mood: For the most part, references to mood in everyday conversation are usually of two types: transient emotions which are dependent upon current circumstances; and emotions which are a pervasive and permanent coloration of the individual's personality. This state-trait bifurcation of moods has presented certain difficulties in the development of emotional measures, e.g., what criteria differentiates an emotional state from an emotional trait? Those researchers who adhere to a state-trait concept of moods have largely failed to clearly specify the parameters of each. Nowlis (1965) has attempted to define the process of moods, choosing to reduce the significance of a bifurcated assumption:

> Mood is the effect on a person of his own configuration of activity. These configurations may be conceptualized as fundamental patterns of general functioning and orientation, such as level of activation, level of control, level of concentration, direction of social orientation, and positive (pleasant) or negative (unpleasant) general appraisal. The effect of these general patterns on the person may be mediated by cues associated with them in the life history and involves affective, cognitive, motivational, and motor responses to the cues; such responses may in turn become functionally related to the general patterns, and may modify, maintain, or even instigate them [Nowlis, 1965, p. 353].

Nowlis regards the concept of mood as rather multidimensional in nature, reflecting not only general circumstances, but the functional dimensionality of the past as well. Therefore, an ideal measure of mood must be broad enough to provide a representation of the emotions brought forth by the major variables effecting the person, without

regards to a state-trait assumption. Several attempts have been initiated to systematically develope global measures of mood, and with some success. However, an assessment procedure of this type is not the most desirable measure for obesity or tobacco smoking research. The ideal mood measure is one which is tailor-made for the specific parameters of emotion identified in these disorders. Unfortunately, much research is needed to further delineate problematic emotions within the disorder as well as the emotional/psychological characteristics of a general lifestyle that indirectly contributes to the overall problem.

Although some negative emotions have been identified in the obesity and tobacco smoking disorders, the total picture is still rather vague and sketchy. Nevertheless, the following evaluations will attempt to describe and evaluate the best available measures of mood as they pertain to the specified emotional problems of these habit disorders.

The Multiple Affect Adjective Check List (Zuckerman, 1960) is composed of 132 adjectives which describe a variety of feeling states. Two forms, "In general," and "Today," provide a state and trait measurement along three affective dimensions: anxiety, depression, and hostility. The subject reads each of the 132 adjectives and places an "X" by the word that describes his or her feeling state of the day (today form) or how he or she feels generally (in general form). Advantages: (a) uncomplicated assessment task; (b) commercially available (EdITS/Educational and Industrial Testing Service, San Diego, California); (c) reliability ($r = .72$);

(d) conflicting validity results (fair for anxiety scores, r_s = -.33 to -.67). Disadvantages. (a) subject to response sets; (b) small normative sample; (c) concurrent validity of hostility and depression scales is poor; (d) makes a state-trait assumption about moods.

The Emotions Profile Index (Kellerman & Plutchik, 1968) is based on the assumptions that (a) personality traits are a mixture of primary emotions; (b) emotions are dialectical in nature; (c) and that eight scales accurately represent the relationships of emotions to traits. The eight scales are: reproduction, incorporation, orientation, protection, deprivation, rejection, exploration, and destruction. The respondent is instructed to select one element of a trait pair from 12 trait names. Results are plotted on a circular grid. Advantages: (a) uncomplicated assessment task; (b) relatively brief; (c) forced choice answers to reduce response bias; (d) reliability is fair (r = .78); (d) commercially available (Western Psychological Services, Los Angeles, California). Disadvantages: (a) lack of validity data; (b) no data reported on scale intercorrelations; (c) philosophical assumptions are fairly weak; (d) lacks systematic rationale for normative sample selection; (e) makes a state-trait assumption about moods.

The Profile of Mood States (Lorr, McNair, Weinstein, Michaux, & Raskin, 1961) consists of 65, five-point adjective rating scales which have been factor analyzed into six mood scores: tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, and confusion-bewilderment. Respondents are to choose the best rating which reflects their emotional state.

Advantages: (a) uncomplicated assessment task; (b) relatively brief; (c) computer scoring available; (d) commercially available (EdITS/Educational and Industrial Testing Service, San Diego, California); (e) reliability is fair (r = .74); (f) large and varied normative sample; (g) has been used as an outcome measure in psychiatric populations. Disadvantages: (a) the few validity studies conducted have been disappointing; (b) scales overlap considerably.

The Mood Adjective Check List (Nowlis, 1965) contains 49 adjectives which are used to describe the feelings of the subject at that moment. Four responses are possible on each adjective: definitely feel relaxed; slightly relaxed; not sure of being relaxed; and definitely not relaxed. After considerable analysis, Nowlis selected 12 factors which best represent mood states: aggression; anxiety; surgency; elation; concentration; fatigue; social affection; sadness; skepticism; egotism; vigor; and nonchalance. Advantages: (a) uncomplicated assessment task; (b) brief; (c) less indication of social desirability response bias. Disadvantages: (a) conflicting reliability results (r_s = .52 to .80); (b) needs comprehensive validity studies; (c) commercially unavailable.

There are a number of single dimension measurement devices, e.g., State-Trait Anxiety Inventory, Cattell Anxiety Questionnaire, Taylor Manifest Anxiety Scale, etc., for the assessment of a particular mood. However, these measures lack a comprehensive application, and therefore are less desirable for the affective dimension.

General Indicators of Psychological Adjustment: Measures of overall personality adjustment can provide data on potential problems outside the limited realm of a particular habit disorder. In addition, a certain amount of overlap does occur between these measures and other affective devices, thus providing a measurement supplement to aid in the clarification of results. Two popular measures will be briefly considered: Minnesota Multiphasic Personality Inventory (MMPI); and the Symptom Check List-90-R (SCL-90-R).

Perhaps the most widely employed test of personality and psychopathology is the MMPI (Hathaway & McKinley, 1967). The original intent of this self-report inventory was the identification of certain disorders in a psychiatric population. The instrument consists of 550 true-false statements which cover a broad range of difficulties, e.g., physical problems to social activity. The scoring system of the MMPI produces 3 validity scales and 10 scales of measurement: Lie, K, F; Hypochondriasis, Depression, Hysteria, Psychopathic Deviate, Masculinity-Feminity, Paranoia, Psychoasthenia, Schizophrenia, Hypomania, and Social Introversion. As stated above, the Depression Scale has been evaluated as one of the better measures of depressive symptoms. In addition, research has generated a plethora of supplementary scales to increase its measurement scope, e.g., anxiety, ego strength, suicide risk, etc. Advantages: (a) uncomplicated assessment task; (b) systematic scoring procedure; (c) a large selection of computer scoring programs; (d) commercially available (The Psychological Corporation, New York, New York); (e) scales to measure protocol validity. Disadvantages: (a) biases in the

selection of the normative sample; (b) structural redundancies to increase interscale reliabilities; (c) heavily oriented toward serious psychopathological disorders; (d) both long and short forms are very lengthy; (e) dependence on intuition of personality traits by scale configurations; (f) conflicting reliability and validity (the overwhelming studies in these areas are inconclusive, reflecting more of a bipartisan trend than solid evidence).

A recently revised measure of psychological adjustment is the SCL-90-R (Derogatis, 1977). This device is a 90-item rating list of symptoms. The respondent is asked to describe on a five-point scale (0--"not at all" to 5--"extremely") how much they were distressed by a particular symptom, e.g., headaches, trembling, crying easily, etc. Raw scores are tallied, converted into t scores and plotted along 12 factors: somatization, obessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism. The remaining three factors (global severity index, positive symptom distress index, and positive symptom total) provide a measure of validity. Several of these measures reflect the important affectional symptoms characteristic of obesity and tobacco smoking research. Advantages: (a) uncomplicated assessment task; (b) brief; (c) systematic scoring system (including a method to calculate scores when items are avoided); (d) good reliability (r_s = .81 to .90; (e) excellent levels of invariance for all nine factors (Derogatis & Cleary, 1977a); (f) strong construct validity (Derogatis & Cleary, 1977b); (g) scales to measure protocol validity Disadvantages: (a) heavily oriented toward the psychopathological

dimension; (b) commercially unavailable (test material must be directly purchased from the author).

Comments

Recommendations for measures in the affective dimension are tentative at best. Many of the same problems in the cognition chapter apply equally here. Much preliminary groundwork is needed to fully delineate the influences of affection in obesity and tobacco smoking research. This early experimental groundwork is essential before tailor-made measurement devices can be formulated.

On the basis of the previous review, dependent measures for the affective dimension have been rank ordered in Tables 6.2 and 6.3.

CHAPTER 6

CONCLUSIONS

As a conclusion to this dissertation, recommendations are made for dependent measure selection within the three dimensions of human functioning. These recommendations have been rank ordered in terms of overall quality (ease of administration, reliability, validity, and cost efficiency) and relevancy to the particular habit disorder (see Tables 6.2 and 6.3).

Throughout this dissertation, tailor-made assessment devices have been repeatedly called for as the ideal measurement strategy direction. Both obesity and tobacco smoking measures are largely deficient in this orientation, especially in the cognitive and affective realms of functioning.

To better illustrate this movement toward customizing measures, a recent attempt has been made to formulate a questionnaire exclusively for use as an adjunct measure in obesity outcome research (Straw, Mahoney, Straw, Rogers, Mahoney, Craighead, & Stunkard, 1980). The Master Questionnaire (MQ) is a 302-item, true-false self-report that is constructed to measure four areas: spouse support, energy balance habits, cognitive factors, and energy balance knowledge. This device was not only developed as an outcome measure, but as a predictor of success in treatment as well. Although further refinement of the scales is needed at this time, this measure has future promise as a standard measure in obesity research; and more

importantly, direction is now established in the development of customized measures within obesity research. Hopefully, this trend will continue.

In retrospect, habit disorder evaluations have progressed quite impressively over the last decade. Researchers are beginning to realize the vast complexities that are characteristic of general habit disorders, and most specifically in obesity and tobacco smoking research. Nevertheless, a disturbing trend in measurement is very apparent from the preceding review: the conation dimension dominates the measurement emphasis in both of these habit disorders. As eluded to earlier, this trend is perhaps a product of tradition, convenience, and a lack of philosophical direction. Be that as it may, we as researchers are faced with the difficult project of reformulating outmoded research opinions and practices to keep pace with new clinical innovations. Hopefully, this review has provided some experimental direction to meet this challenge.

Table 6.2

Rank Order Recommendations for Dependent Measure Selection in Obesity Outcome Research

Measurement Source[a]	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection
Body Weight					
	weight reduction index	1	✓		
	body mass index	2	✓		
	weight/height ratio	3	✓		
	ponderal index	4	✓		
	% weight loss	5	✓		
	absolute lbs. lost[b]	6	✓		
Body Fat					
	skinfold caliper[c]	1	✓		
	(Lange)	(1)			
	(Harpenden)[d]	(2)			
	(Best)	(3)			

Table 6.2 (continued)

Measurement Source	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection
Body Fat (cont.)					
	hydrostatic displacement[e]	2	✓		
Observations					
	natural observations	1	✓		
	(quasi-natural)	(1)			
	(natural)	(2)			
	analogue	2	✓		
	(taste-rating task)	(1)			
	(food machines)	(2)			
Energy Expenditure					
	self-report estimates	1	✓		
	body condition[f]	2	✓		
Self-Report					
	monitoring logs	1	✓	✓	✓

Table 6.2 (continued)

Measurement Source	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection
Cognitions					
	construct grid[g]	1		✓	✓
	dialogue recording	2		✓	
	self-perception scales	3		✓	✓
	(Tennessee)	(1)			
	(LAV)	(2)			
	(Janis)	(3)			
	(Coopersmith)	(4)			
	(SES)	(5)			
Emotions					
	Depression Rating Scales[h]	1		✓	✓
	(Beck)	(1)			
	(MMPI-D)	(2)			

Table 6.2 (continued)

Measurement Source	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection
Emotions (contd.)					
	(Zung)	(3)			
	(DACL)	(4)			
	Mood Self-reports	2			✓
	(PMS)	(1)			
	(MACL)	(2)			
	(MAACL)	(3)			
	(EPI)	(4)			
General Adjustment					
	SCL-90-R	1	✓	✓	✓
	MMPI	2	✓	✓	✓

[a]Devices should be selected so that a multidimensional overlap of measurement sources is achieved, e.g., body weight, body fat, energy expenditure, self-report, cognitions, affections, and general adjustment levels.

Table 6.2 (continued)

Measurement Source	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection

[b] This measure can be used as a general source of feedback to the subject.

[c] Use the 4-site body determination illustrated by Durnin & Rahaman (1967).

[d] Manufactured in Great Britain.

[e] Appropriate for precise measurements.

[f] Extensive research is needed in this area to establish its utility.

[g] Grids have the potential for measurement within both cognitive and affective dimensions.

[h] Since depression rating scales and mood self-reports are easy to administer, both should be given to subjects.

Table 6.3

Rank Order Recommendations for Dependent Measure Selection in Tobacco Outcome Research

Measurement Source[a]	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection
Tobacco Consumption					
	% tobacco consumed	1	✓		
	# products consumed	2	✓		
Biochemical Analysis					
	thiocyanate	1	✓		
	carbon monoxide[b]	2	✓		
	nicotine/cotinine	3	✓		
	carbon dioxide	4	✓		
	MLE tobacco assay	5	✓		
Observations					
	natural observations	1	✓		
	analogue	2	✓		

Table 6.3 (continued)

Measurement Source	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection
Observations (cont.)					
	(topography)	(1)			
	(taste-test)	(2)			
Self-report					
	monitoring logs	1	✓	✓	✓
	addiction measurement	2	✓	✓	✓
Informant reports		1	✓		
Cognitions					
	construct grid	1		✓	✓
	dialogue recording	2		✓	
	self-perception scales	3		✓	✓
	(Tennessee)	(1)			
	(LAV)	(2)			
	(Janis)	(3)			

Table 6.3 (continued)

Measurement Source	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection
Cognitions (cont.)					
	(Coopersmith)	(4)			
	(SES)	(5)			
Emotions					
	Depression Rating Scales[c]	1		✓	✓
	(Beck)	(1)			
	(MMPI-D)	(2)			
	(Zung)	(3)			
	(DACL)	(4)			
	Mood Self-Reports	2			✓
	(PMS)	(1)			
	(MACL)	(2)			
	(MAACL)	(3)			
	(EPI)	(4)			

Table 6.3 (continued)

Measurement Source	Measurement Device	Order of Preference	Measurement Dimension		
			Conation	Cognition	Affection
General Adjustment					
	SCL-90-R	1	✓	✓	✓
	MMPI	2	✓	✓	✓

[a]Devices should be selected so that a multidimensional overlap of measurement sources is achieved, e.g., tobacco consumption, biochemical analysis, self-reports, informant reports, cognitions emotions and general adjustment levels.

[b]Use the Ecolyzer 2000 Series monitor and polyvinyl collection bags.

[c]Since depression rating scales and mood self-reports are easy to administer, both should be given to subjects.

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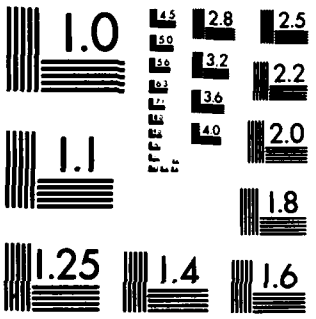

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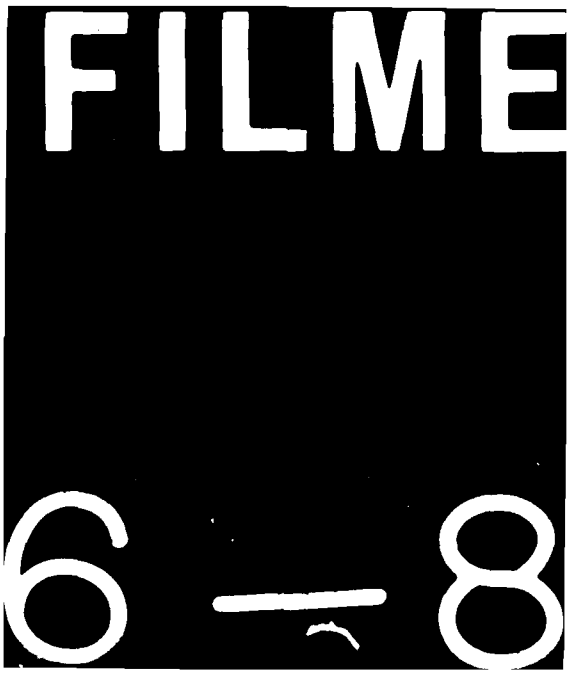
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